THE STUDY OF GEOINFORMATICS WITH THE USE OF GAMING MOMENTS
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Abstract

Currently, Geoinformatics has become a well established and rapidly evolving science, which demanded inclusion of its elements in the education programme.

In the classroom you can offer students to study some geographic information system on their own so that to write a research paper (essay) or research articles to be further published at the conference. For the labs you can choose from one or more traditional systems, such as *Mapinfo Professional*, at the beginning of each laboratory work describe the potentialities of this system and then give specific tasks. In this way we obtain practical skills and theoretical knowledge on the subject.

In the study of geographic information systems it is important to interest the learner. Here can be useful such games on the GPS based navigation as orienteering and geocaching.

Keywords:

Geoinformatics, geographic information system, map, layer, visualize, geocaching.

Introduction

The concept of geographic information systems [3], geoinformation systems, Geoinformatics as a science emerged in the second half of the last century, this was mainly related to the emergence of computer technology and the need to operate the geographical information using the computer. Currently, Geoinformatics has become a well established and rapidly evolving science, which demanded inclusion of its elements in the education programme. In technical colleges and universities there were courses "GIS", "geographic information technologies" publications of textbooks [2], teaching work-outs on the subject [1]. There are publications on the subject of this article, guidelines for conducting classes on Geoinformatics have been presented in [4], [5].

1. The study of geographic information systems

The question arises how to present this course – purely theoretical presentation of the material, or heuristic, independent study of this material by the students.

At present, everyone is faced with such applied aspects of Geoinformatics as *Yandex.Maps*, *Google Maps* and other Internet services necessary for orientation in space.

Commonly used are GPS coordinates, by which you can find any point on the Earth's surface, any object which is equipped with a special sensor: a cell phone, a bus, a machine at the factory, a man with a special bracelet, etc.

Also known are systems such as *2GIS (2GIS),* after reading which the majority starts to use them constantly.

In a broad sense, a *geographic information system* (GIS) is a system of collection, storage, analysis and graphical visualization of spatial (geographical) data and related information about the necessary objects [3].

In modern geoinformation systems, you can create your own maps or routes, connect them with different coordinates, add any data to finished maps.

Currently in Russia there are more than 20 GIS, which can be classified as fully functional. Of foreign most well-known system there is *Mapinfo Professional*, from domestic developments: *GeoLink GIS "Panorama"*.

On the website of KB "PANORAMA" (http://gisinfo.ru/) in the section "Products", we can choose geographic information systems we are interested in, download the relevant cards and within one month to explore the possibilities of these systems for free, with the possibility of later purchasing the licensed version.

Thus, the class can offer students to study the appropriate system, followed by writing a research paper (essay) or research articles to be published further at the conference. In this case, you can offer the existing all-Russian scientific-practical conference "Geographic information systems in modern world" (http://www.econf.rae.ru/conference/880) or any other on relevant topics. Thus, students not only learn a new discipline, but also participate in research activities.

For the labs you can choose from one or more traditional systems, such as *Mapinfo Professional*, at the beginning of each laboratory work describe the potentialities of this system and then give specific tasks.

For example:

1. Work with the scale of the map display.

2. Review the information about the countries on the map of the world.

3. Create graphs of the number of populations for several countries.

4. Add to your map a new layer.

5. Perform the auto-signing for the objects layer.

6. Independently construct a map of the districts of the city, regions or areas.

Each task can be described in detail by steps, accompanying them by illustrations. Report on the laboratory work can be required in the form of synopsis with a detailed description of the steps and images of the screen elements of a computer program during execution of work.

In this way, we obtain practical skills and theoretical knowledge on the subject.

The theoretical part is given in the lecture course. There we examine the concept of geographic information systems, Geoinformatics as a science, technology, and production, GIS capabilities (data sources, coordinate systems, spatial data models, cartographic visualization of data [2]), GIS as the basis for integration of spatial data and technologies (GIS and remote sensing, GIS and global positioning systems, GIS and Internet), design and implementation of GIS. One can also consider the security issues of data in GIS [1]: threats to the security of information in GIS, the basic mechanisms of protecting information in GIS, the concept of mandatory access differentiation in GIS, the regulatory documents on information security in Geoinformatics.

Further, depending on the specific specialization of the University, we can consider specialized geographic information systems:

• GIS "Operator" for power structures.

• Municipal GIS "Earth and real estate".

• A set of programs "workstation of geologist".

• "Panorama AGRO" for agriculture.

• GIS "Ecological monitoring and Analytics".

There are software tools designed to create, edit, and print digital maps and plans of cities for different purposes, maintaining databases, setting up custom forms for viewing tables, query and reports to view the schemes of territorial planning, urban cadastre and other tasks.

2. The use of game highlights in the study of Geoinformatics

In the study of geographic information systems it is important to interest the learner. Geographic information systems are widely used in professional and everyday activities. In connection with rapid development of GPS navigation and the emergence of a large variety of GPS-navigators (including a built-in navigation feature in cell phones) there are various active games associated with it [8].

One of them is *orienteering* using GPS navigation in an unfamiliar area. On the map are specified landmarks, and the players are on the route marked on each point in random order.

Another game-based navigation GPS is *geocaching*. It is as follows. In a certain place is placed a container with some objects, it is well disguised, and on a particular site its GPS coordinates are given. Players with GPS Navigator, find the container marked in the log (which is

also in the container), and change one of the items for its equivalent. Then they are registered on the geocaching website. The game can be for speed or for the number of geocaches found.

These games can interest the participants in a more detailed study of location, principles of locating coordinates from the satellites, work with paper and electronic maps, with various geographic information systems.

Thus, we can consider the geographic information system, both theoretically and practically, continue to use the acquired skills and knowledge in everyday life and in professional activities.

Referenses

1. Babenko L.K. Zashhita dannyh geoinformacionnyh sistem: ucheb. posobie dlja studentov vuzov. / [Babenko L.K., Basan A.S, Zhurkin I.G. i dr.] Pod red. I.G. Zhurkina. – M.:Gelios ARV, 2010. – 336 s.

2. Kapralov E.G. Geoinformatika: v 2 kn. Kn. 1: uchebnik dlja stud. vyssh. ucheb. zavedenij. / [E.G. Kapralov, A.V. Koshkarjov, V.S. Tikunov i dr.]; pod red. V.S. Tikunova. – 3-e izd., pererab. i dop. – M.: Izdatel'skij centr «Akademija», 2010. – 400 s.

3. Mironova Yu.N. Geoinformacionnye sistemy // Aktual'nye problemy gumanitarnyh i estestvennyh nauk №03 (62) 2014 Ch.I., Moskva, s. 63 – 65.

4. Mironova Yu.N. Primenenie igrovyh momentov v izuchenii geoinformatiki // XI Vserossijskaja nauchno-prakticheskaja konferencija «Soderzhatel'no-processual'naja paradigma professional'nogo obrazovanija: preemstvennost', innovacii, perspektivy». (27 marta 2015 goda, Leninogorsk). Kazan', 2015, s. 225-226.

5. Mironova Yu.N. Izuchenie geoinformacionnyh sistem // Mezhdunarodnaja nauchno-prakticheskaja konferencija «Geograficheskie aspekty ustojchivogo razvitija regionov», 23-24 aprelja 2015 g.: materialy: v 2 ch. Ch. 2 – Gomel': GGU im. F. Skoriny, 2015, s. 158–160.

6. Mironova Yu.N. Primenenie sistem global'nogo pozicionirovanija v geoinformacionnyh sistemah // Teoreticheskie i prikladnye problemy geografii: Materialy mezhdunarodnoj nauchno-prakticheskoj konferencii (Astana, 9-10 ijunja 2014 g.). – Astana, 2014, chast' II, s. 307-309.

7. Mironova Yu.N. Geographic information systems and their classificaton // International Journal Of Applied And Fundamental Research. – 2016. – № 1 – URL: www.science-sd.com/463-24961 (26.04.2016).

8. Vsjo o GPS-navigatorah (spravochnik). / Sostaviteli: V.S. Nejman, A.E. Samojlov, N.R. Il'in – M.: NT Press, 2005. – 392 s.